

Appl. No. 10/057,666
Amendment dated August 2, 2004
Reply to Office action of Feb. 3, 2004

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A fault tolerant optical amplifier apparatus for amplifying transmission signals, said apparatus comprising:

a first amplifying fiber segment having a first and second ends, a first set of said transmission signals propagating through said first fiber segment;

a first directional coupler coupled to said first end of said first amplifying fiber segment;

a first optical pump source coupled to said first directional coupler, said pump source supplying pump to said first amplifying fiber segment such that a portion of said pump power remains after propagation through said first amplifying fiber segment;

a second amplifying fiber segment having a first and second ends, a second set of said transmission signals propagating through said second fiber segment, said second set of said transmission signals being different from said first set of said transmission signals;

a second directional coupler coupled to said first end of said second amplifying fiber segment;

a second optical pump source coupled to said second directional coupler, said pump source supplying pump power to said second amplifying fiber segment;

a third directional coupler coupled to said second end of said first amplifying fiber segment;

a fourth directional coupler coupled to said second end of said second amplifying fiber segment; and

a bi-directional optical connection disposed between said third and fourth couplers, such that said portion of pump power remaining after propagation through said first amplifying fiber segment is supplied to said second amplifying fiber segment via said third coupler, said bi-directional connection and said fourth coupler; and

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a feed back circuit communicating with said first pump source and said second pump source, said feedback circuit generating a feedback signal to adjust the power output associated with one of said first pump source and said second pump source when the other of said first pump source and said second pump source fails.

2. (Original) The apparatus in accordance with claim 1 wherein a portion of said pump power supplied to said second amplifying fiber segment remains after propagation through said second amplifying fiber segment, said portion of said remaining pump power supplied to said first amplifying fiber segment via said third coupler, said bi-directional connection and said fourth coupler.

3. (Previously presented) The apparatus in accordance with claim 1, wherein said first pump source supplies said pump power to said first amplifying fiber segment in a co-propagating direction with respect to the propagation of said first set of said transmission signals through said first amplifying fiber segment.

4. (Previously presented) The apparatus in accordance with claim 1, wherein said first pump source supplies said pump power to said first amplifying fiber segment in a counter propagating direction with respect to the propagation of said first set of said transmission signals through said first amplifying fiber segment.

5. (Previously presented) The apparatus in accordance with claim 1, wherein said transmission signals is a first set of transmission signals, said amplifying apparatus further comprising a second set of transmission signals propagating through said second amplifying fiber segment, wherein said second pump source supplies said pump power to said second amplifying fiber segment in a co-propagating direction with respect to the propagation of said second set of said transmission signals through said second amplifying fiber segment.

6. (Previously presented) The apparatus in accordance with claim 1, wherein said transmission signals is a first set of transmission signals, said amplifying apparatus further

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comprising a second set of transmission signals propagating through said second amplifying fiber segment, wherein said second pump source supplies said pump power to said second amplifying fiber segment in a counter propagating direction with respect to the propagation of said second set of said transmission signals through said second amplifying fiber segment.

7. (Previously presented) The apparatus in accordance with claim 2, wherein said portion of said remaining pump power is supplied to said first amplifying fiber in a co-propagating direction with respect to the propagation of said first set of said transmission signals through said first amplifying fiber segment.

8. (Previously presented) The apparatus in accordance with claim 2, wherein said portion of said remaining pump power is supplied to said first amplifying fiber in a counter propagating direction with respect to the propagation of said first set of said transmission signals through said first amplifying fiber segment.

9. (Previously presented) The apparatus in accordance with claim 1, wherein said transmission signals is a first set of transmission signals, said amplifying apparatus further comprising a second set of transmission signals propagating through said second amplifying fiber segment, said portion of said remaining pump power is supplied to said second amplifying fiber in a co-propagating direction with respect to the propagation of said second set of said transmission signals.

10. (Previously presented) The apparatus in accordance with claim 1, wherein said transmission signals is a first set of transmission signals, said amplifying apparatus further comprising a second set of transmission signals propagating through said second amplifying fiber segment, said portion of said remaining pump power is supplied to said second amplifying fiber in a counter propagating direction with respect to the propagation of said second set of said transmission signals.

11. (cancelled)

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12. (cancelled)

13. (Currently Amended). A method for providing pump power to an optical amplifier apparatus for amplifying first and second sets of optical transmission signals, said method comprising the steps of:

providing a first pump signal to a first amplifying fiber segment;

providing a second pump signal to a second amplifying fiber segment;

directing said first set of transmission signals through said first amplifying fiber segment, wherein said first pump signal propagates through said first amplifying fiber segment in a co-propagating direction with respect to said first set of transmission signals;

directing said second set of transmission signals through said second amplifying fiber segment, said second set of transmission signals being different from said first set of transmission signals, wherein said second pump signal propagates through said second amplifying fiber segment in a counter-propagating direction with respect to said second set of transmission signals;

directing a portion of said first pump signal to said second amplifying fiber segment after said first pump signal propagates through said first amplifying fiber segment; and

directing a portion of said second pump signal to said first amplifying fiber segment after said second pump signal propagates through said second amplifying fiber segment.

14. (Canceled)

15. (Canceled)

16. (Canceled)

17. ((Canceled))

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Amendments to the Drawings:

The attached sheets of formal drawings include changes to FIGS. 1 and 2, which correct informalities such as the hand-written numerals. This sheet, which includes FIGS. 1 and 2, replaces the original sheet including FIGS. 1 and 2.

Attachment: Replacement Sheets